Technology Gap

By Carl R. Augusto

While the Internet's World Wide Web and Microsoft's Windows 95 have increased popular interest in personal computers and in the information superhighway, we Americans who are blind or otherwise visually impaired are being forced onto a side road.

For a decade, we have made great strides toward equality in employment and education through the use of DOS-based personal computers equipped with screen magnifiers or voice or Braille playback of what we write at the keyboard.

Computer software ignores the blind.

Corporate executives, computer systems analysts, airline reservations agents as well as professors and lawyers use this equipment to download research services and write books and briefs.

Apple and I.B.M. have developed software that makes their operating systems accessible to us, but most of the information technology developed for the mass market has been designed with virtually no consideration for people with limited eyesight. Windows 95, the world's most popular operating system, relies on graphics that are difficult and sometimes impossible to transform for voice or Braille playback. The same is true of Netscape, one of the most popular ways to access the Internet.

Agencies for the blind are receiving numerous reports from clients who say they can't get or keep jobs because of Windows software. This problem may have legal ramifications under the Americans With Disabilities Act, but that's not our first concern now.

A little noticed provision of the Telecommunications Act of 1996 requires the industry to do what it has not done voluntarily: Give us an equal opportunity to use its products. The companies now have to address the problem. But they must do so during product development; if they simply retrofit equipment after it reaches the stores, we will constantly be playing catch-up.

We are already far behind. A 1991-92 Census Bureau survey reported that only 26 percent of people between the ages of 21 and 64 whose vision was severely limited had jobs.

This disparity, now aggravated by the technology gap, is unfair to many of the 9.7 million blind or visually impaired Americans, more than half of whom are 55 or older. We have fought for equality far too long to become second-class citizens again. □

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ADAPTIVE TECHNOLOGIES COMPUTING FOR ALL
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by Julia King

Thousands of blind and visually impaired computing professionals and their companies are caught in a costly and seemingly futile exercise in high-tech catch-up. On one side of the scenario are commercial software giants such as Microsoft Corp., whose steady flow of graphical applications and Windows operating system enhancements do not include standard hooks for tying into software for braille, speech output and other adaptive systems.

That leaves blind users such as Dave Simpson waiting months, even years for access to widely used Windows-based business packages. And each time a new version is released, Simpson must wait again for the updated adaptive software. "Just when something comes out for us that should work with Windows, there's always something new. Now, for instance, it's the Chicago version of Windows," said Simpson, a database administrator at Bell Atlantic Corp. in Philadelphia. On the other side are a handful of modestly capitalized third-party software and hardware companies such as Arctic Technologies, Inc. in Troy Mich. Like other firm in the specialized world of computerized accessibility products, Arctic has been bedeviled by application mapping problems. The primary source of these woes are the multiple program interfaces commercial developers randomly built into mainstream Windows-based packages. "The primary problem is that so many applications programmers don't use the standard APIs (application programming interface) already in Windows. Microsoft itself is one of the primary offenders," said Arctic President Dale MacDaniel. "It leaves us pulling our hair out because we don't have enough hours or staff to take everybody's applications and write special drivers for them."

Playing catch-up translates into additional costs for corporations. This, in turn, can prompt internal political battles over who pays.

At Federal Express Corp. in Nashville, officials have yet to decide how to distribute the costs of adaptive hardware and software used by nine customer service representatives who are blind or visually impaired.

"Economics is a major issue any business needs to look at because [adaptive] equipment is not cheap," said Scott Hooker, a senior information planning analyst at Fedex. Hooker, who is blind, functions as a technical troubleshooter for the nine workers. When blind workers are first hired, state or rehabilitation agencies generally pay for adaptive equipment, Hooker noted. "But once the employee is no longer a client of that agency, the question is, where does the money come from to update their equipment?" Looking for a money tree At Bell Atlantic, disabled employees are furnished with the equipment they need to do their job, said Ginger Rogers, a job accommodations specialist in the human resources department. "But human resources doesn't have a bucket of dollars where any person with a disability can come to us and we'll pay for it." Rogers said. "It's a departmental responsibility. If accommodation is going to allow an employee to do a job, [the department] is going to have to eat it."

Accommodation costs could be reduced greatly if software vendors used a standard set of interfaces in their commercial packages from the outset, rather than targeted information systems users who are blind or otherwise disabled as a totally separate market, according to Lee Day, a former software engineer at Digital Equipment Corp.'storage products group in Colorado Springs.

For example, Day said IBM sells a separate screen-reader package that gives blind users access to its OS/2 operating system as well as Windows. "but the functionality in that package, which costs $800 on top of buying OS/2, could have been included in OS/2 itself," Day said. Had Microsoft implemented universal hooks on its Windows operating environment, it would have cost users 25 cents to 50 cents more per copy, Day estimated. Day said one of the reasons she left her job at Digital after 10 years was irreconcilable differences over accessibility issues.

Another was pure frustration. "I left largely due to frustration [I felt over] getting smaller and smaller pieces of things to do while hearing about all the neat stuff that was going to be developed," Day said.

Like other users who are blind, Day emphasized that she does not view today's lack of software accessibility as some diabolical plot hatched by vendors. Rather, she and others such as Hooker believe it is an awareness issue. "Most product designers that don't use universal hooks are not doing it on purpose. They're not out to ruin some blind guy's day," Hooker said. Instead, "They're just not aware of what it does to access."

Sidebar: Rethinking Disability

"Just about every piece of software on the market today has been designed without an awful lot of thought to accessibility," acknowledges Greg Lowney, senior manager and sole staffer of Microsoft's accessibility and disabilities group. To help change this, Lowney said Microsoft has published and distributed to thousands of independent software vendors guidelines that explain disability issues and how products and work with disability aids.

Moreover, the next version of Windows will include a tool kit feature that allows screen-reading programs to work better with certain graphical information. Farther out, Lowney said greater use of Object Linking and Embedding Technology should greatly increase application integration. But for now, Microsoft has no plans to implement standard access methods across the company's far reaching product line. Individual business units will continue to develop products as they see it.

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Raymond "Bud" Keith is not your basic on-line Web head. He has climbed Mount Rainier in Washington state three times, taught blind children and adults for two years in Panama as a Peace Corps volunteer, earned a doctorate in special education, and bikes and skis frequently.

His nine ski trips to Norway won him the Order of St. Olav, on of that country's highest honors, because of his work on behalf of sports for the handicapped.

The 56-year-old Arlington resident has maintained his active lifestyle despite being blind because of a childhood accident. Mr. Keith lost his left eye at age 10 when a classmate hit him in the eye with a nail. His right eye began to weaken, and within six months of the accident he was completely without sight.

Through his proficiency on the Internet, Mr. Keith communicates with people around the world, and a growing number of computer companies are developing technology to help him and other blind people.

"Many people think that the computer is one of two of the greatest developments for blind people," he says. "It's equally as important as Braille, and there's an argument that it's more important than Braille."

Two key developments allowing blind people to use the Internet are a speech-based screen reader and a voice synthesizer. The software announces to the user the contents of the screen through a digitally synthesized voice, bypassing the graphics, photos, icons, forms and frames that sighted people rely on.

Mr. Keith, who speaks Spanish fluently, can program his synthesizer to pronounce that language correctly, as well as English. "Graphics are basically pictures and not words," he says. "The move toward graphic things like Windows [is] slowing us down."

"More designers are getting more caught up in the visual appearance and forgetting that they are leaving blind people behind."

An exception is Web browser Microsoft Explorer 3.0. The Redmond, Wash., company has developed blind-friendly technology that "will run circles around Netscape [for the blind]," says Dennis Brown of MicroTalk, a small company in Texarkana, Texas, that serves the blind.

"Netscape Communications of Mountain View Calif., "has been very, very, very uncooperative with our cause," said Roland Manning of GW Micro in Fort Wayne, Ind., who creates technology for the blind and is blind. Blind people, he added, are not viewed as a large enough consumer group to attract Netscape business.

However, as many as 62,000 blind people use computers at home or at work, according to the American Foundation for the Blind.

One of them is Cathy Murtha, a Pioneer, Calif., housewife who navigates through pwWebSpeak, a Web browser specifically designed for blind people. Created by The Productivity Works based in Trenton, N.J., it transmits graphics, photos and frames from Web pages into spoken language.

Mrs. Murtha specializes in creating and finding text-based Web pages for blind Internet users to listen to through their speech readers. Her own sight on the Web (http://www.access.digex.net/~jdixon) has received more than 3,000 hits and 180 letters from grateful blind people since she started it up six months ago.

Judy Dixon, a blind employee at the Library of Congress, also has a blind-oriented Web page (http://ww2.cdepot.net/~mist). A Braille display, which takes the place of the screen for the blind allows her to read text from TV programs.

"The coolest thing about the Internet for blind people is being able to read things. Now I can read the phone book. It doesn't sound like much, but it is," she says.

Ray Ingram, executive vice president of The Productivity Works, plans to make e-mail accessible to blind and disabled people by telephone by years end.

"You would hook up to a central number and then you would hear your e-mail. It turns e-mail into voice mail," Mr. Ingram explains.

Denver Resident Phil Scovell, a blind person trying to provide the computer-related information that is increasing demand by the blind, owns an information service and runs a site on the Web (http://www.crl.com/phil).

The service, called "Internet Phonebook of Blind Users and Services. He e-mails it monthly to more than 400 blind people worldwide.

All this is still a drop in the bucket, says Mr. Keith, who retired in August after 24 years as a senior civil rights worker with the Department of Health and Human Services. He wants more organizations to volunteer to make less graphical and more text-based pages.

"It's terrible to think we would have to do it through regulation," he says. "Too often, laws and regulation are the only way we can acheive equality, because the goodwill of the public just doesn't make it happen."

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Technology Computer Icons Block Access for the Blind

by Audrey Choi
Staff Reporter of The Wall Street Journal

Cynthia Ice thought she had a promising career at Lotus Development Corp. With an advanced degree in engineering, she was an adept troubleshooter at the software company, helping users navigate Lotus 1-2-3 and other products.

Ms. Ice is blind, but she was able to do her job as well as any sighted worker, thanks to the array of technological aids like Braille printers and screen readers, which convert text on screen into synthesized speech.

Then came Windows.

With its extensive use of graphics, tool-bars and picture-driven instructions, Microsoft Corp.'s operating system dealt a devastating setback to blind computer-users. Their DOS-based screen readers were useless, often just saying "icon" or "picture" when confronted with a graphic on the screen.

"All of a sudden, it was like going back to the days when I first lost my vision and everything was frustrating," says Ms. Ice, who lost her eyesight due to complications from diabetes. She managed to avoid Windows in her job for a while, but as it became more dominant in the work world, that became more difficult. She left Lotus last June after nine years with the company and is unemployed.

An estimated 120,000 people in the U.S. have no vision and about 1.1 million are legally blind. In addition, there are roughly four million working-age Americans who say they can't see well enough to read ordinary print even when wearing glasses and would require screen readers and enlargers to be part of the labor force.

Technology once opened doors for visually impaired people. But the transition to picture-driven technology has closed some workplace opportunities again. On- screen graphics aren't the only problem. Graphics are being used increasingly in public information kiosks, cellular phones, cash machines, and even microwave ovens, stereos and other common consumer electronics.

"Every time we go into Brookstones, there are fewer and fewer things my wife and I can use," says Doug Wakefield, who is blind and who works at the Center for Information Technology Accommodation. "People who think Windows is a problem ain't seen nothing yet," he says.

The Internet, for example, once gave the blind access to the world's text- based libraries. But it has been transformed in recent years into a showplace of snazzy video clips and pictures, where Web pages often can only be retrieved by "drilling down" through a number of graphics, a task that's nearly impossible for blind users.

"When I first lost my sight, one of the best things about the computer was that I could go onto the Internet and get access to information -- to newspapers, stock quotes, anything," Ms. Ice says. "Now I have to spend half my time finding a Web site that is actually accessible," she adds.

Other visually impaired workers have faced similar setbacks. Joseph Lazarro had a thriving career as a free-lance writer, reviewing computer software for Byte Magazine. "With my DOS screen readers it was so easy to use and test all the new software products that many of my editors didn't even know I was blind," Mr. Lazarro says. But he had to stop when the advent of Windows meant he was barely able to run new software, let alone review it. Now he works at the Massachusetts Commission for the Blind, trying to make more workplaces suitable for the disabled.

Advocates for the blind say that making technology accessibile need not be prohibitively costly or difficult -- if developers include the features as part of the original design. While equipping a television with closed-captioning used to cost hundreds of dollars when it was added later by deaf viewers, it costs just a few dollars now that the capability is built in to all new televisions. Similarly, making software programs accessible to the blind requires a few simple modifications, such as remembering to include a line or two of text description whenever there is an icon.

Microsoft officials acknowledge that they did not originally include such text descriptions with Windows. They say they wanted to leave opportunities open for independent software developers to build the tools. But Microsoft compounded the problem by not establishing clear programming standards for all software developers. As a result, a screen reader might work with one Windows application, but not another.

"With every evolution of software, the adaptive things out there broke," concedes Gary Moulton, a product manager for disability solutions at Microsoft. "Folks with disability really began to fall behind," he says.

Apple Computer Inc. initially encountered similiar problems when it introduced the graphics-based Macintosh, but because it never dominated the workplace as much as Microsoft, it was easier for blind users to find alternatives. Apple later helped a software developer produce a screen reader that works well with Mac computers.

In recent months, Microsoft has taken steps to improve the accessibility of Windows products, Mr. Moulton says. Six people now work on accessibility issues -- instead of just one. And a package of software tools to enable accessibility features --codenamed ActiveX Accessibility -- is now being tested by blind users. But there is no timetable as to when those aids will be included in commercially available versions of Microsoft products.

"Microsoft has done a great deal of work and there should be a breakthrough in the next year or so," says Charlie Crawford, director of the Massachusetts Commission for the Blind. "But for people trying to keep their jobs, it's like telling a cancer patient, 'just hang on for a few more months, and maybe a cure will come along,"' Mr. Crawford says.

Advocates for the blind also are eagerly monitoring the development of the programming language, Java, and software "applets," in the hope these new tools will make the Internet more accessible to the disabled. "Things are changing so fast, you can't just keep patching them," says Gregg Vanderheiden, director of the Trace Center, a research center that encourages technology developers to build in accessibility features from the beginning, rather than as an afterthought.

Several federal statutes now require government agencies to buy accessible technology. The Social Security Administration, for example, is awarding a contract for computer hardware and software systems that must accommodate disabled employees. For Peter Read, who is blind, it's about time. Once one of the agency's most technologically adept, Mr. Read says he has been lagging behind his coworkers as he clings to his old DOS applications.

"It's like being in a footrace with someone faster than you," he frets. "They keep going, and you're falling behind faster all the time."

MICROSOFT TRYING TO MAKE 'WINDOWS' ACCESSIBLE TO BLIND
All Things Considered
National Public Radio
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LINDA WERTHEIMER, Host: For most computer users, the trend toward graphic interfaces like Microsoft's Windows has been a blessing. The mouse is easier than the keyboard. But for one constituency, Windows is a curse. Blind computer users say their jobs are threatened unless Microsoft makes Windows more accessible. Microsoft says it's doing that. David Wright of member station WBUR reports.

DAVID WRIGHT, Reporter: One of the first things you notice about Jamal Mazrui's office at Harvard's Kennedy School of Government is that his computer screen is off when he sits down to type. He doesn't need it because his headphones, or his computer speaker, tells him everything. [sound of screen reader program]

[interviewing] You can understand what's it's saying there?

JAMAL MAZRUI, Blind Computer User: Yeah, I can understand it fully. I'm just used to hearing it. It's like learning a foreign accent.

DAVID WRIGHT: Mazrui, who's blind, is the Kennedy School's alumni database coordinator. He's in charge of some 15,000 names used for everything from invitations to special conferences to appeals for money. The Kennedy School has outfitted Mazrui with the latest hardware and software, equipment that reads the screen aloud to him as he goes. But the software, called a screen reader program, doesn't work very well with Windows, so when the Kennedy School switches over to Windows next year, it could pose a problem.

JAMAL MAZRUI: I couldn't still be developing information systems in the way that I'm doing now, and I'd have to change to a job that was less computer intensive.

DAVID WRIGHT: Mazrui sets out to illustrate the trouble his screen reader has with a particular program. That's assuming he can find the program he wants to demonstrate.

JAMAL MAZRUI: This demonstration came sooner than I expected. This is, in my opinion, the best from what I've heard so far at accessing Windows, and somehow the program is confused.

DAVID WRIGHT: [interviewing] So you'll keep clicking and pointing and clicking and just getting more and more frustrated.

JAMAL MAZRUI: Yes. I'm about to reboot.

DAVID WRIGHT: For a growing number of blind computer users, the problem with Windows is no laughing matter. Computers that support Windows enjoy an 80 percent market share among business users. And as Windows gradually eclipses DOS as the standard in corporate America, blind people

who are otherwise proficient at computers face the prospect of losing jobs or opportunities for advancement. Bonnie O'Day, a member of the National Council on Disabilities, notes that this is one of the few cases where advances in technology have brought negative consequences for the blind.

BONNIE O'DAY, National Council on Disabilities: When the microcomputer or the desktop computer became popular in the 1980s, it opened up a vast array of employment opportunities for blind people. What's happened in the 1990s is that with the advent of graphical user interface, or what we often call Windows, those opportunities are starting to be closed.

DAVID WRIGHT: The problem with Windows isn't simply that blind users can't see where to point and click; it's that graphical software by definition works through pictures, not text that can be read aloud by a screen reader program. Greg Vanderheiden is a University of Wisconsin specialist in technology and disability programming. Vanderheiden runs a federally funded research and development center that works with Microsoft and other computer companies to help them make their products more accessible.

GREG VANDERHEIDEN, University of Wisconsin: Microsoft has been working with providing better access for a broad range of disabilities. And in their current beta for Windows '95, they have built in a dozen or so special features just for people with physical, hearing, and other disabilities. The one weakness has always been access by people who are blind, and this is a very, very important one since it's one of the primary access issues around graphical user interfaces.

DAVID WRIGHT: Other companies that produce graphical user interfaces, Apple and IBM, solved that problem years ago by providing entry points in the software called hooks that a screen reader can latch on to and interpret what's happening on the screen. Microsoft Windows does not included the necessary hooks, but company officials have promised to fix that in upcoming editions of the program. Josh Hurst, one of the product managers for Wmdows, says Microsoft has been working hard to address the blind community's concerns.

JOSH HURST, Microsoft: I will admit that Microsoft has never really had a public corporate statement of our commitment to this area, and that is one of the things that's changed over the recent weeks instead. Now Microsoft has- rather than sort of working quietly on things as we've been doing, now we're actually coming out and publicly making a statement for everyone to see that this important to us.

DAVID WRIGHT: Advocates for the disabled say what turned the situation around may have been a growing recognition of the problem as a civil rights issue, not simply a problem with technology. Eight states had already begun to consider whether to stop buying Microsoft products because of accessibility concerns. For National Public Radio, I am David Wright in Boston.